State of Wisconsin

2004

Prairie Island

Environmental Radioactivity Survey

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Table of Contents

List of Tables

List of Figures

State Of Wisconsin DHFS

2004

Prairie Island Environmental Radioactivity Survey

Introduction

Wisconsin Public Health Statues 254.41 mandates the Department of Health and Family Services to conduct environmental radiation monitoring around the nuclear power facilities that impact Wisconsin. This environmental monitoring report is for the Prairie Island nuclear generating plant for the calendar year January - December 2004 and provides a description and results of this environmental monitoring program.

WI DHFS Prairie Island Environmental Monitoring Sampling Program

The WI DHFS environmental monitoring program consists of the collection of various types of samples from the air, water and terrestrial exposure pathways. The sampling program included samples of air, precipitation, ambient gamma radiation (TLD), surface water, fish, soil, milk, well water and vegetation that are collected from selected locations at planned sampling intervals.

Table 1 is a listing of sampling sites and includes a description, direction and distance from the monitored power plant. Table 2 provides a listing of types of samples collected, sites where samples are collected, the number of samples collected, number of samples that were missed and a listing of the required analyses. Table 3 provides an explanation of missing samples or non-routine sample analyses. Figure 1 is a map showing the location of each environmental sampling site.

Program Modifications

The following program modifications were implemented in 2004.

PRI-14; milk: The A Huppert farm decided not to participate in the Prairie Island monitoring program and was replaced with site PRI-15, R. Peterson farm, in February. The sampling frequency remained unchanged with the required analyses indicated in Table 1.

Laboratory Services and Quality Assurance

The analysis of the samples is performed under contract with the State Laboratory of Hygiene (SLH). SLH maintains their own quality assurance program. Analytical procedures provide for routine replicate analyses to verify methods and instrument operation. Traceable sources are used to regularly calibrate the counters and daily performance checks are made between calibrations. In addition, quality control charts are maintained on the counters.

SLH participates in the Environmental Resource Associates' Proficiency Testing program and has performed satisfactorily over the report period. Proficiency testing results are available from the State Laboratory of Hygiene.

Detection Limits

Detection limits, required by WI DHFS, will be expressed as a lower limit of detection (LLD). The required WI DHFS LLD as indicated in Table 4 under the heading “LLD” is an "a priori" estimate of the capability for detecting an activity concentration by a given measurement system, procedure, and type of sample. Counting statistics of the appropriate instrument background are used to compute the LLD for each specific analysis. Using 4.66 times the standard deviation (s_b) of the instrument background, the LLD for each specific analysis is defined at the 95% Confidence Level.

The LLD for each radioisotope listed in Table 4 has been calculated from the following equation:

$$LLD = \frac{4.66\ s_b}{E * V * 2.22 * Y * S * \exp(-dt)}$$

Where:

LLD	is the "a priori" lower limit of detection as defined above, as picocuries per unit mass or volume,
s_b	is the standard deviation of the background counting rate or of the counting rate of blank sample as appropriate, as counts per minute,
E	is the counting efficiency, as counts per disintegration,
V	is the sample size in units of mass or volume,
2.22	is the number of disintegrations per minute per picocurie,
Y	is the fractional radiochemical yield, when applicable,
S	is the self-absorption correction factor,
d	is the radioactive decay constant for the particular radionuclide, and
t	for environmental samples is the elapsed time between sample collection, or end of the sample collection period, and time of counting.

Typical values for E, V, Y and dt have been used to calculate the LLD.

Reporting of Sample Analysis Results

Results for specific analyses will be reported as either a “less than” (<) value or an actual activity value. The reporting of results in Table 4 under the heading “Range” and in Tables 5-14 are “a posteriori” calculations based on the actual analysis performed using the actual sample values for E, V, Y and dt. Typically the reported “less than” (<) results are lower than the required WI DHFS LLD indicating that the required WI DHFS LLD has been met.

In late March and early April, SLH was in the process of upgrading from one software vendor to another for the qualitative and quantitative analysis of environmental samples. As a result some reported “less than” numbers for some analyses did not meet the required WI DHFS LLD. These reporting deviations have been indicated in Table 3.

An actual activity value will be accompanied by an uncertainty term for that analysis. The uncertainty term is a plus or minus counting uncertainty term at the 2 sigma (95%) confidence interval and is printed as (+- or $\pm$). Examples and explanations of data reporting are:

Example	Nuclide	Activity reported
1	^{137}Cs	< 10 pCi/liter
2	^{137}Cs	15 $\pm$ 3 pCi/liter

In example 1 we can be 95% confident that the sample activity, if any, is less than the MDC of 10 pCi/liter. In example 2 we can be 95% confident that the actual sample activity is greater than the MDC for that analysis and is between 12 and 18 pCi/liter.

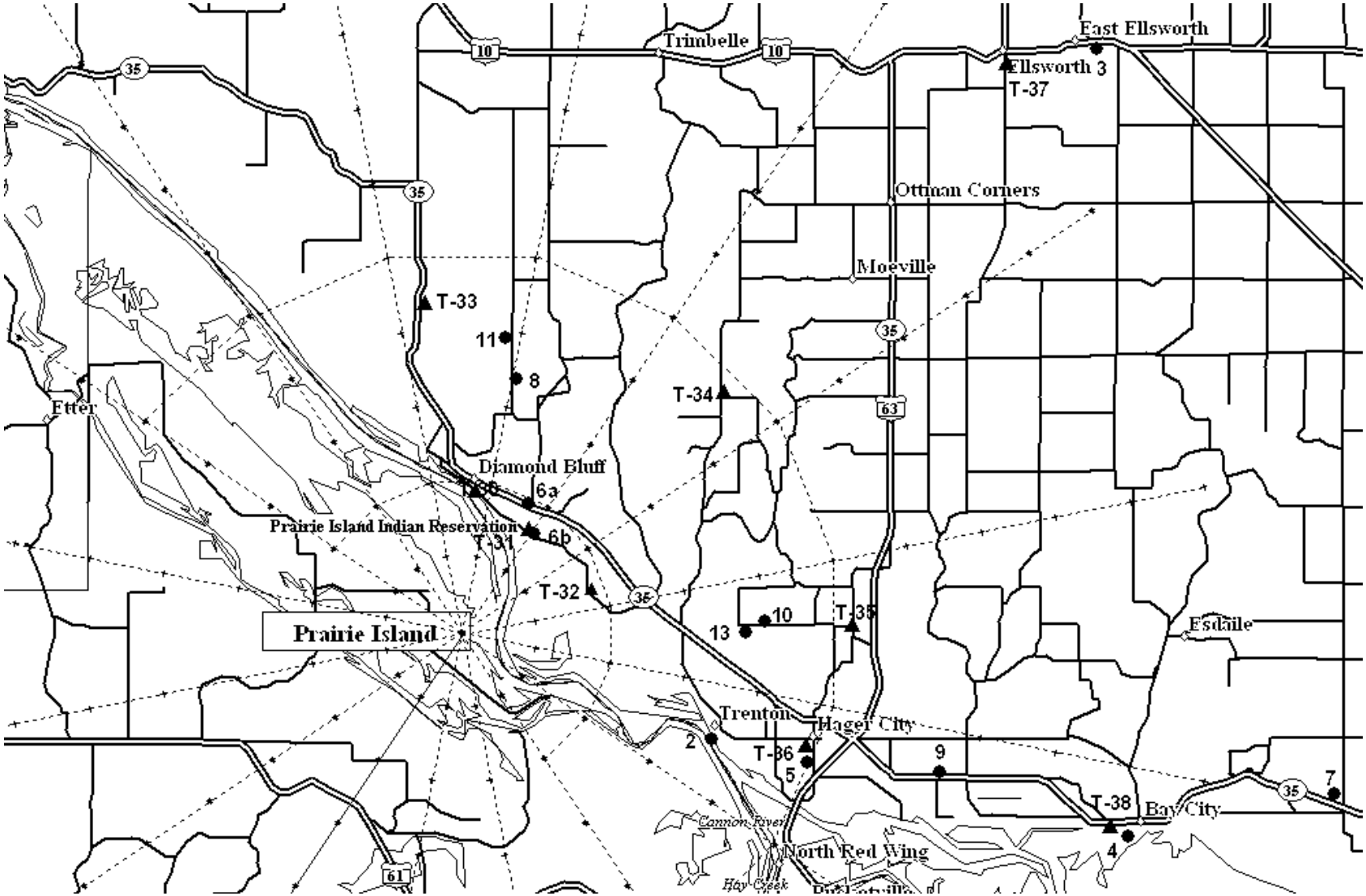

Figure 1. Location of WI DHFS environmental monitoring sites for the Prairie Island monitoring program

Table 1. WI DHFS Prairie Island environmental monitoring sampling sites.

Sample site	Distance and direction (miles)	Location description
PRI-1a	11.6 NW	Prescott; air site
PRI-1b	11.6 NW	Prescott; harbor area
PRI-2	3.6 ESE	Trenton
PRI-3	10.9 NE	Ellsworth (discontinued 07/01/96)
PRI-4a	8.7 ESE	Bay City park
PRI-4b	8.7 ESE	Bay City, Hwy 35
PRI-5	4.8 ESE	Hager City
PRI-6a	1.9 NNE	Diamond Bluff; Pierce County highway shed
PRI-6b	1.8 NNE	Diamond Bluff cemetery
PRI-7	11.9 E	Junction of Hwy 35 & Cty D (discontinued 07/01/96)
PRI-8	3.4 N	Station 2 - farm
PRI-9	6.6 ESE	Bay City substation on Hwy 35
PRI-10	2.6 NE	Welch farm
PRI-11	4.0 NNE	D. Dosdall farm (discontinued in March, 1995)
PRI-12	11.1 NNW	S. Rohl farm (discontinued in October, 1999)
PRI-13	3.8 E	Christiansen farm
PRI-14	13.8 N	A. Huppert farm (discontinued in February 2004)
PRI-15	13.9 N	R. Peterson farm
PRI-T30	1.9 N	Diamond Bluff
PRI-T31	1.7 NNE	Diamond Bluff
PRI-T32	1.8 ENE	290th Avenue
PRI-T33	4.4 N	Hwy 35, Thomas Killian residence
PRI-T34	4.7 NE	Cty K and 840th Street
PRI-T35	5.2 E	Cty VV and 790th Street
PRI-T36	4.8 ESE	Hager City
PRI-T37	10.3 NE	Ellsworth
PRI-T38	8.9 ESE	Bay City, Hwy 35
PRI-T39	11.6 NW	Prescott

Table 2. Sample collection summary and required analyses for 2004.

Sample Type	Collection and Frequency	Site locations	Number of Samples Collected	Number of Sample Deviations	Required Analyses
Air Particulate	C/BW	1a, 6a, 9	77	2	GA, GB, GI
Air Iodine	C/BW	1a, 6a, 9	78	0	GI
Precipitation	C/BW	1a, 9	11	1	GB, H
TLD	C/Q	T30 – T39	39	1	direct exposure
Surface Water	G/SA	1b, 2, 4a	6	0	GA, GB, GI, Sr, H
Fish	G/SA	upstream, downstream	4	0	GI
Vegetation	G/SA	1b, 4b, 5, 6a, 8, 9	12	0	GA, GB, GI
Soil	G/SA	1b, 4b, 5, 6a, 8, 9	12	0	GA, GB, GI
Well Water	G/SA	4a, 5, 6b	6	0	GA, GB, H
Milk	G/M	10, 13, 14, 15	24	1	GI, I, Sr

Collection type: C/ = continuous; G/ = grab

Frequency: /W = weekly; /M = monthly; /Q = quarterly; /A = annually; /BW = bi-weekly; /SA = semi-annually

Required analyses: GA = gross alpha; GB = gross beta; GI = gamma isotopic; Sr = strontium; I = iodine; H = tritium

Table 3. WI DHFS missing sample report or non-routine analyses for 2004.

Sample type	Date	Site	Explanation
Air Particulate	12/27/04	PRI-9	No gross beta data available since the air filter was not properly positioned in the holder and allowed air flow past the filter.
Precipitation	January	1a, 9	Unable to collect a sample due to lack of precipitation.
TLD	4th quarter	PRI-T32	No data; TLD was lost in the field.
Air Gamma Isotopic	1st quarter	all sites	In late March and early April, SLH was in the process of upgrading from one software vendor to another for the qualitative and quantitative analysis of environmental samples. As a result some reported "less than" numbers for some analyses did not meet the required WI DHFS LLD.
Milk	04/14/04	PRI-15	In late March and early April, SLH was in the process of upgrading from one software vendor to another for the qualitative and quantitative analysis of environmental samples. As a result some reported "less than" numbers for some analyses did not meet the required WI DHFS LLD.

Results And Discussion

Air Particulate

A summary of reported activities by WI DHFS for air particulate samples is included in Table 4. Results from the individual sample analyses are listed in Tables 5-6.

From the individual activities or quarterly averages for gross beta activities it may be noted that there are no significant differences between sites at different distances from the Prairie Island facility. With no significant difference with distance from the Prairie Island site, an increase in gross beta activity attributable to the Prairie Island plant operation is not evident.

The gamma isotopic analysis of the quarterly air particulate filter composites detected only small amounts of the radioisotopes listed in Table 4. Beryllium-7 (^{7}Be), detected in all composites, is a naturally occurring radioisotope that is constantly produced through nuclear reactions between cosmic rays and nuclei in the atmosphere and is detected in air composites from other areas of the state.

Influence by the Prairie Island nuclear generating facility on air quality is not evident from air particulate analysis.

Air Iodine

A summary of reported activities by WI DHFS for air iodine samples is included in Table 4. Results from the individual sample analyses are listed in Table 5.

Air iodine measurements were all below the MDC of 0.07 pCi/m^3 for all sites.

Direct Radiation - Thermoluminescent Dosimeters (TLD's)

A summary of reported activities by WI DHFS for direct radiation is included in Table 4. Results from the individual sample analyses are listed in Table 7.

Direct radiation (TLD) data for 2004 from the WI DHFS network was comparable for all sites. Significant differences in exposure were not noticed at different distances from the Prairie Island nuclear facility. The average quarterly exposure from the ten sites located within Wisconsin was 14.5 $\pm$ 2.1 milliroentgens. The average quarterly exposure for 2004 is at background levels and is comparable to other areas within Wisconsin.

Precipitation

A summary of reported activities by WI DHFS for precipitation is included in Table 4. Results from the individual sample analyses are listed in Table 8.

The gross beta activity in precipitation was within the normal range of activity when compared to previous years data.

Surface Water

A summary of reported activities by WI DHFS for surface water samples is included in Table 4. Results from the individual sample analyses are listed in Table 9.

The surface water samples showed no unusual activities and are at background levels comparable to previous years. From the gamma isotopic analysis all radioisotopes were below their respective minimum detectable concentration. All reported activities for gross beta, gross alpha and tritium (^{3}H) are at background levels. The surface water samples uniformly show activities well below state or federal standards.

Fish

A summary of reported activities by WI DHFS for fish samples is included in Table 4. Results from the individual sample analyses are listed in Table 10.

The fish samples showed no unusual activities. Naturally occurring potassium-40 (^{40}K) was detected in all samples. All other radioisotopes were below their respective minimum detectable concentration.

Well Water

A summary of reported activities by WI DHFS for well water samples is included in Table 4. Results from the individual sample analyses are listed in Table 11.

The well water samples showed no unusual gross alpha and gross beta activities and all activities for tritium (^{3}H) were less than its minimum detectable concentration. The activity levels are all below state and federal standards.

Milk

A summary of reported activities by WI DHFS for milk samples is included in Table 4. Results from the individual sample analyses are listed in Table 12.

Analysis of the milk samples showed no unusual activities. Naturally occurring potassium-40 (^{40}K) was detected in all samples. The detected activities for strontium-90 (^{90}Sr) are attributable to residual fallout

from previous atmospheric nuclear weapons testing and were also detected in previous years at similar activity levels.

Vegetation

A summary of reported activities by WI DHFS for vegetation samples is included in Table 4. Results from the individual sample analyses are listed in Tables 13.

Analysis of the vegetation samples showed no unusual activities. The gamma isotopic analysis detected only small amounts of the naturally occurring radioisotopes beryllium-7 (^{7}Be) and potassium-40 (^{40}K) listed in Table 4. All other radioisotopes were below their respective minimum detectable concentration.

Soil

A summary of reported activities by WI DHFS for soil samples is included in Table 4. Results from the individual sample analyses are listed in Table 14.

Analysis of the soil samples showed no unusual activities. The gamma isotopic analysis detected only small amounts of the radionuclides listed in Table 4. Potassium-40 (^{40}K) is a naturally occurring radioisotope. The reported activities for cesium-137 (^{137}Cs) were also detected in previous years and are largely attributable to fallout from previous atmospheric nuclear weapons testing. Naturally occurring radioisotopes such as radium-226 (^{226}Ra), bismuth-214 (^{214}Bi), lead-214 (^{214}Pb), actinium-228 (^{228}Ac), bismuth-212 (^{212}Bi) and lead-212 (^{212}Pb) from the naturally occurring uranium-238 (^{238}U) and thorium-232 (^{232}Th) decay series are commonly detected but have not been quantified or reported.

Dose to an Average Individual

Federal regulations 10 CFR 20, 10 CFR 50 Appendix I and 40 CFR 190 restrict the annual exposure of the population from all parts of the nuclear fuel cycle, including nuclear power plants. Doses resulting from gaseous and liquid effluent releases from the Prairie Island nuclear generating facilities are less than the limits as stated in these Federal regulations.

The WI DHFS limits for permissible levels of radiation exposure from external sources in unrestricted areas is defined in the Wis. Adm. Code section HFS 157.23. Doses resulting from gaseous and liquid effluent releases from the Prairie Island nuclear generating facilities are less than the limits as stated in Wis. Adm. Code section HFS 157.23.

References

State of Wisconsin, Wisconsin Administrative Code, HFS 157.23

U.S. Environmental Protection Agency, Environmental Radiation Requirements for Normal Operations of Activities in the Uranium Fuel Cycle, EPA 520/4-76-016, 40 CFR Part 190, November 1976.

U.S. Nuclear Regulatory Commission, Title 10, Part 20.

U.S. Nuclear Regulatory Commission, Title 10, Part 50, Appendix I.

Table 4. Sample activity summary for the Prairie Island environmental monitoring program for 2004.

Sample type (units)	MDC	Number of samples [a]	Analysis	Range
Air Particulate	0.003	77 / 77	gross beta	0.010 - 0.039
(pCi/m^3)			gamma isotopic	
	0.015	12 / 12	Be-7	0.035 - 0.069
	0.002	12 / 0	Mn-54	< 0.0006
	0.002	12 / 0	Co-58	< 0.0009
	0.010	12 / 0	Fe-59	< 0.0027
	0.005	12 / 0	Co-60	< 0.0008
	0.010	12 / 0	Zn-65	< 0.0013
	0.003	12 / 0	Nb-95	< 0.0017
	0.006	12 / 0	Zr-95	< 0.0016
	0.004	12 / 0	Ru-103	< 0.0015
	0.010	12 / 0	Ru-106	< 0.0045
	0.010	12 / 0	I-131	< 1.3
	0.002	12 / 0	Cs-134	< 0.0005
	0.002	12 / 0	Cs-137	< 0.0007
	0.020	12 / 0	Ba-140	< 0.080
	0.010	12 / 0	La-140	< 0.027
	0.004	12 / 0	Ce-141	< 0.0029
	0.006	12 / 0	Ce-144	< 0.0030
Air Iodine	0.07	78 / 0	I-131	< 0.051
(pCi/m^3)				
Surface Water	2.5	6 / 4	gross beta (sol)	< 2.4 - 4.0
(pCi/liter)	2.5	6 / 0	gross beta (insol)	< 2.5
	2.8	6 / 0	gross alpha (sol)	< 2.3
	2.8	6 / 1	gross alpha (insol)	< 1.4 - 1.3
	700	6 / 0	H-3	< 300
	4.0	6 / 0	Sr-89	< 0.7
	1.0	6 / 1	Sr-90	< 0.3 - 0.5
			gamma isotopic	
	13	6 / 0	Mn-54	< 11
	15	6 / 0	Co-58	< 10
	30	6 / 0	Fe-59	< 22
	15	6 / 0	Co-60	< 12
	30	6 / 0	Zn-65	< 21
	15	6 / 0	Nb-95	< 11
	30	6 / 0	Zr-95	< 19
	20	6 / 0	I-131	< 14
	13	6 / 0	Cs-134	< 11
	12	6 / 0	Cs-137	< 12
	60	6 / 0	Ba-140	< 46
	20	6 / 0	La-140	< 16

Table 4. Sample activity summary for the Prairie Island environmental monitoring program for 2004.

Sample type (units)	MDC	Number of samples [a]	Analysis	Range
Fish			gamma isotopic	
(pCi/kg wet)	600	4 / 4	K-40	2650 - 3300
	50	4 / 0	Mn-54	< 30
	65	4 / 0	Co-58	< 40
	145	4 / 0	Fe-59	< 110
	70	4 / 0	Co-60	< 37
	130	4 / 0	Zn-65	< 80
	50	4 / 0	Nb-95	< 42
	100	4 / 0	Zr-95	< 70
	50	4 / 0	Cs-134	< 30
	60	4 / 0	Cs-137	< 32
Precipitation	1.5 [b]	11 / 6	gross beta	< 0.31 -1.00
(nCi/m^2)	300 [b]	11 / 0	H-3	< 60
Well Water	5.0	6 / 2	gross beta	< 1.8 - 1.8
(pCi/liter)	5.0	6 / 0	gross alpha	< 3.0
	300	6 / 0	H-3	< 300
Vegetation	5000	12 / 0	gross alpha	< 3000
(pCi/kg wet)	5000	12 / 12	gross beta	5400 - 9700
			gamma isotopic	
	800	12 / 12	Be-7	450 - 2600
	1500	12 / 12	K-40	3700 - 7900
	90	12 / 0	Mn-54	< 90
	100	12 / 0	Co-58	< 70
	200	12 / 0	Fe-59	< 190
	100	12 / 0	Co-60	< 100
	250	12 / 0	Zn-65	< 210
	100	12 / 0	Nb-95	< 70
	200	12 / 0	Zr-95	< 160
	130	12 / 0	I-131	< 80
	80	12 / 0	Cs-134	< 80
	90	12 / 0	Cs-137	< 80
	350	12 / 0	Ba-140	< 280
	100	12 / 0	La-140	< 90

Table 4. Sample activity summary for the Prairie Island environmental monitoring program for 2004.

Sample type (units)	MDC	Number of samples [a]	Analysis	Range
Soil	6000	12 / 12	gross beta	11000 - 26000
(pCi/kg dry)	10000	12 / 1	gross alpha	< 6000 - 8000
			gamma isotopic	
	700	12 / 12	K-40	9400 - 14100
	60	12 / 0	Mn-54	< 30
	90	12 / 0	Co-58	< 41
	600	12 / 0	Fe-59	< 110
	90	12 / 0	Co-60	< 33
	300	12 / 0	Zn-65	< 100
	100	12 / 0	Nb-95	< 50
	250	12 / 0	Zr-95	< 70
	80	12 / 0	Cs-134	< 46
	80	12 / 12	Cs-137	72 - 286
Milk	1.0	24 / 22	Sr-90	< 0.3 - 1.6
(pCi/liter)	0.5	17 / 0	I-131	< 0.5
			gamma isotopic	
	300	24 / 24	K-40	1350 - 1670
	15	24 / 0	Mn-54	< 11
	15	24 / 0	Co-58	< 11
	40	24 / 0	Fe-59	< 26
	15	24 / 0	Co-60	< 12
	40	24 / 0	Zn-65	< 26
	15	24 / 0	Nb-95	< 11
	40	24 / 0	Zr-95	< 21
	15	24 / 0	I-131	< 19
	15	24 / 0	Cs-134	< 11
	15	24 / 0	Cs-137	< 11
	60	24 / 0	Ba-140	< 52
	15	24 / 0	La-140	< 15
Direct Exposure	1.0 [c]	39 / 39	direct exposure	10.8 - 19.8
(mR/Std Qtr)				

a - Number of analyses / number of analyses detected above the WI DHFS MDC.
b - MDC activities expressed in units of pCi/liter.
c – 1.0 mR/ TLD

Table 5: WI DHFS air particulate and air iodine (I-131) analysis results from the Prairie Island environmental monitoring program.

Measurements in units of pCi/m^3

PRI-1a Prescott				PRI-6a Diamond Bluff			
Collection Date	**Volume m^3**	**Air Particulate**	**Air Iodine**	**Collection Date**	**Volume m^3**	**Air Particulate**	**Air Iodine**
01/09/04	983	0.034 +- 0.002	< 0.016	01/09/04	1300	0.035 +- 0.002	< 0.017
01/22/04	909	0.035 +- 0.002	< 0.014	01/22/04	1207	0.035 +- 0.002	< 0.009
02/03/04	860	0.030 +- 0.002	< 0.016	02/03/04	1139	0.030 +- 0.002	< 0.015
02/17/04	983	0.039 +- 0.002	< 0.015	02/17/04	1311	0.037 +- 0.002	< 0.014
03/06/04	1216	0.028 +- 0.002	< 0.013	03/06/04	1609	0.028 +- 0.001	< 0.010
03/18/04	821	0.021 +- 0.002	< 0.021	03/18/04	1091	0.021 +- 0.002	< 0.012
04/03/04	1081	0.015 +- 0.001	< 0.051	04/03/04	1435	0.014 +- 0.001	< 0.033
1st quarter mean +- s.d.		**0.029 +- 0.008**	**< 0.021**	**1st quarter mean +- s.d.**		**0.029 +- 0.008**	**< 0.016**
04/18/04	975	0.019 +- 0.002	< 0.034	04/18/04	1305	0.018 +- 0.001	< 0.024
05/01/04	853	0.013 +- 0.002	< 0.024	05/01/04	1133	0.013 +- 0.001	< 0.019
05/16/04	975	0.015 +- 0.001	< 0.034	05/16/04	1303	0.014 +- 0.001	< 0.025
05/31/04	957	0.010 +- 0.001	< 0.028	05/31/04	1295	0.011 +- 0.001	< 0.023
06/12/04	735	0.012 +- 0.002	< 0.042	06/12/04	1012	0.012 +- 0.001	< 0.031
06/28/04	985	0.010 +- 0.001	< 0.024	06/28/04	1400	0.010 +- 0.001	< 0.015
2nd quarter mean +- s.d.		**0.013 +- 0.003**	**< 0.031**	**2nd quarter mean +- s.d.**		**0.013 +- 0.003**	**< 0.023**
07/11/04	772	0.018 +- 0.002	< 0.031	07/11/04	1087	0.016 +- 0.001	< 0.019
07/26/04	825	0.016 +- 0.002	< 0.027	07/26/04	1171	0.017 +- 0.001	< 0.017
08/07/04	770	0.019 +- 0.002	< 0.035	08/07/04	1096	0.019 +- 0.002	< 0.023
08/23/04	906	0.015 +- 0.002	< 0.028	08/23/04	1274	0.015 +- 0.001	< 0.015
09/07/04	856	0.022 +- 0.002	< 0.020	09/07/04	1193	0.022 +- 0.002	< 0.018
09/17/04	723	0.020 +- 0.002	< 0.037	09/17/04	1016	0.018 +- 0.002	< 0.018
10/02/04	909	0.020 +- 0.002	< 0.031	10/02/04	1255	0.022 +- 0.001	< 0.018
3rd Qtr mean +- s.d.		**0.019 +- 0.002**	**< 0.030**	**3rd Qtr mean +- s.d.**		**0.018 +- 0.003**	**< 0.018**
10/17/04	946	0.016 +- 0.002	< 0.025	10/17/04	1310	0.015 +- 0.001	< 0.018
11/01/04	969	0.015 +- 0.001	< 0.027	11/01/04	1319	0.015 +- 0.001	< 0.017
11/13/04	781	0.023 +- 0.002	< 0.038	11/13/04	1076	0.019 +- 0.002	< 0.036
11/29/04	1023	0.022 +- 0.002	< 0.017	11/29/04	1396	0.023 +- 0.001	< 0.016
12/14/04	992	0.026 +- 0.002	< 0.039	12/14/04	1353	0.026 +- 0.001	< 0.026
12/27/04	893	0.027 +- 0.002	< 0.025	12/27/04	1198	0.027 +- 0.002	< 0.016
4th Qtr mean +- s.d.		**0.022 +- 0.005**	**< 0.029**	**4th Qtr mean +- s.d.**		**0.021 +- 0.005**	**< 0.022**

Table 5: WI DHFS air particulate and air iodine (I-131) analysis results from the Prairie Island environmental monitoring program.

Measurements in units of pCi/m^3

Bay City substation
PRI-9

Collection Date	Volume m^3	Air Particulate	Air Iodine
01/09/04	1333	0.033 +- 0.002	< 0.010
01/22/04	1230	0.035 +- 0.002	< 0.013
02/03/04	1166	0.031 +- 0.002	< 0.013
02/17/04	1336	0.036 +- 0.002	< 0.015
03/06/04	1658	0.028 +- 0.001	< 0.011
03/18/04	1124	0.022 +- 0.002	< 0.016
04/03/04	1474	0.015 +- 0.001	< 0.033
1st quarter mean +- s.d.		**0.029 +- 0.008**	**< 0.016**
04/18/04	1338	0.018 +- 0.001	< 0.029
05/01/04	1171	0.012 +- 0.001	< 0.018
05/16/04	1330	0.014 +- 0.001	< 0.020
05/31/04	1334	0.010 +- 0.001	< 0.025
06/12/04	1039	0.012 +- 0.001	< 0.026
06/28/04	1426	0.010 +- 0.001	< 0.015
2nd Qtr mean +- s.d.		**0.013 +- 0.003**	**< 0.022**
07/11/04	1104	0.017 +- 0.001	< 0.022
07/26/04	1178	0.017 +- 0.001	< 0.016
08/07/04	1110	0.018 +- 0.001	< 0.023
08/23/04	1308	0.013 +- 0.001	< 0.016
09/07/04	1217	0.023 +- 0.002	< 0.020
09/17/04	1040	0.021 +- 0.002	< 0.036
10/02/04	1282	0.021 +- 0.001	< 0.018
3rd Qtr mean +- s.d.		**0.018 +- 0.003**	**< 0.022**
10/17/04	1338	0.016 +- 0.001	< 0.018
11/01/04	1353	0.015 +- 0.001	< 0.020
11/13/04	1100	0.018 +- 0.001	< 0.033
11/29/04	1425	0.023 +- 0.001	< 0.011
12/14/04	1389	0.025 +- 0.001	< 0.006
12/27/04 *a	1259		< 0.012
4th Qtr mean +- s.d.		**0.019 +- 0.004**	**< 0.017**

*a - No gross beta data available since the air filter was not properly positioned in the holder and allowed air flow past the filter.

Table 6. WI DHFS gamma isotopic analysis results from the quarterly composites of air particulate filters collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi/m^3

	1st quarter	2nd quarter	3rd quarter	4th quarter
Prescott PRI-1a				
Be-7	0.046 +- 0.002	0.055 +- 0.002	0.069 +- 0.004	0.045 +- 0.003
Mn-54	< 0.0002	< 0.0001	< 0.0005	< 0.0006
Co-58	< 0.0005	< 0.0002	< 0.0009	< 0.0007
Fe-59	< 0.0018	< 0.0004	< 0.0027	< 0.0018
Co-60	< 0.0002	< 0.0001	< 0.0005	< 0.0008
Zn-65	< 0.0005	< 0.0003	< 0.0011	< 0.0013
Nb-95	< 0.0013	< 0.0002	< 0.0017	< 0.0010
Zr-95	< 0.0010	< 0.0003	< 0.0016	< 0.0012
Ru-103	< 0.0009	< 0.0002	< 0.0015	< 0.0007
Ru-106	< 0.0018	< 0.0011	< 0.0042	< 0.0045
I-131	< 1.3000	< 0.0019	< 0.2500	< 0.0038
Cs-134	< 0.0003	< 0.0001	< 0.0004	< 0.0005
Cs-137	< 0.0002	< 0.0001	< 0.0005	< 0.0007
Ba-140	< 0.0414	< 0.0022	< 0.0800	< 0.0050
La-140	< 0.0199	< 0.0013	< 0.0270	< 0.0028
Ce-141	< 0.0013	< 0.0002	< 0.0029	< 0.0008
Ce-144	< 0.0007	< 0.0004	< 0.0030	< 0.0021
Diamond PRI-6a				
Be-7	0.044 +- 0.002	0.054 +- 0.002	0.067 +- 0.003	0.040 +- 0.002
Mn-54	< 0.0002	< 0.0001	< 0.0004	< 0.0003
Co-58	< 0.0003	< 0.0001	< 0.0006	< 0.0004
Fe-59	< 0.0014	< 0.0004	< 0.0020	< 0.0008
Co-60	< 0.0002	< 0.0001	< 0.0003	< 0.0003
Zn-65	< 0.0004	< 0.0003	< 0.0008	< 0.0009
Nb-95	< 0.0010	< 0.0002	< 0.0012	< 0.0005
Zr-95	< 0.0007	< 0.0003	< 0.0012	< 0.0007
Ru-103	< 0.0007	< 0.0002	< 0.0010	< 0.0004
Ru-106	< 0.0014	< 0.0010	< 0.0032	< 0.0027
I-131	< 1.1000	< 0.0020	< 0.1900	< 0.0024
Cs-134	< 0.0002	< 0.0001	< 0.0003	< 0.0003
Cs-137	< 0.0001	< 0.0001	< 0.0003	< 0.0003
Ba-140	< 0.0349	< 0.0023	< 0.0600	< 0.0036
La-140	< 0.0163	< 0.0009	< 0.0230	< 0.0015
Ce-141	< 0.0011	< 0.0003	< 0.0021	< 0.0007
Ce-144	< 0.0006	< 0.0007	< 0.0021	< 0.0017
Bay City PRI-9				
Be-7	0.044 +- 0.002	0.054 +- 0.002	0.068 +- 0.003	0.035 +- 0.002
Mn-54	< 0.0002	< 0.0001	< 0.0004	< 0.0003
Co-58	< 0.0003	< 0.0001	< 0.0006	< 0.0003
Fe-59	< 0.0014	< 0.0004	< 0.0018	< 0.0008
Co-60	< 0.0002	< 0.0001	< 0.0004	< 0.0003
Zn-65	< 0.0004	< 0.0003	< 0.0009	< 0.0006
Nb-95	< 0.0010	< 0.0002	< 0.0011	< 0.0003
Zr-95	< 0.0007	< 0.0003	< 0.0011	< 0.0005
Ru-103	< 0.0007	< 0.0002	< 0.0009	< 0.0003
Ru-106	< 0.0014	< 0.0010	< 0.0031	< 0.0023
I-131	< 1.3000	< 0.0021	< 0.1600	< 0.0016
Cs-134	< 0.0002	< 0.0001	< 0.0003	< 0.0003
Cs-137	< 0.0001	< 0.0001	< 0.0003	< 0.0003
Ba-140	< 0.0325	< 0.0025	< 0.0450	< 0.0031
La-140	< 0.0160	< 0.0008	< 0.0220	< 0.0013
Ce-141	< 0.0011	< 0.0003	< 0.0012	< 0.0003
Ce-144	< 0.0006	< 0.0006	< 0.0012	< 0.0008

Radioisotopes other than those reported were not detected.

Table 7. WI DHFS TLD network for the Prairie Island environmental monitoring program.

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:	01/14/04	04/14/04	07/14/04	10/13/04
Date Removed:	04/14/04	07/14/04	10/13/04	01/12/04
Days in the Field:	91	91	91	91
Location:	individual quarterly data is reported as: mR / Standard Quarter +- combined total uncertainty			
TLD sites that are located 0 - 2 miles from the Prairie Island				
30	11.9 +- 2.4	13.0 +- 2.6	13.3 +- 2.7	15.6 +- 3.1
31	11.7 +- 2.3	12.6 +- 2.5	13.2 +- 2.6	15.2 +- 3.0
32	10.8 +- 2.2	13.7 +- 2.7	12.9 +- 2.6	ND
Quarterly average +- s.d.	11.5 +- 0.6	13.1 +- 0.6	13.1 +- 0.2	15.4 +- 0.3
TLD sites that are located 2 - 5 miles from the Prairie Island				
33	14.6 +- 2.9	15.5 +- 3.1	16.4 +- 3.3	18.7 +- 3.7
34	15.0 +- 3.0	16.6 +- 3.3	17.4 +- 3.5	19.8 +- 4.0
35	13.5 +- 2.7	15.2 +- 3.0	15.5 +- 3.1	16.9 +- 3.4
36	11.9 +- 2.4	16.5 +- 3.3	14.1 +- 2.8	18.7 +- 3.7
Quarterly average +- s.d.	**13.8 +- 1.4**	**16.0 +- 0.7**	**15.9 +- 1.4**	**18.5 +- 1.2**
TLD sites that are located greater than 5 miles from the Prairie Island facility.				
37	13.3 +- 2.7	14.5 +- 2.9	14.9 +- 3.0	16.2 +- 3.2
38	12.3 +- 2.5	12.0 +- 2.4	13.3 +- 2.7	14.4 +- 2.9
39	12.2 +- 2.4	12.6 +- 2.5	13.7 +- 2.7	14.8 +- 3.0
Quarterly average +- s.d.	12.6 +- 0.6	13.0 +- 1.3	14.0 +- 0.8	15.1 +- 0.9

ND - No data; TLD was lost in the field.

Table 8. WI DHFS analysis results for precipitation samples collected from the Prairie Island environmental monitoring program.

Measurements expressed as nCi/m^2

	Inches	Gross Beta	Tritium
January 2004	***a**		
02/17/04	1.57	0.40 +- 0.08	< 12
03/18/04	3.85	0.44 +- 0.14	< 29
04/18/04	0.81	0.05 +- 0.03	< 6
05/16/04	4.17	< 0.25	< 32
06/12/04	7.90	1.00 +- 0.40	< 60
07/26/04	3.33	< 0.20	< 25
08/23/04	3.25	< 0.20	< 25
09/17/04	4.91	< 0.31	< 37
10/17/04	1.15	< 0.07	< 9
11/29/04	2.60	0.40 +- 0.13	< 20
12/14/04	0.30	0.18 +- 0.02	< 2

a - Precipitation was not available in January 2004

Table 9. WI DHFS analysis results of surface water samples collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Collection date	**05/25/04**	**05/25/04**	**05/25/04**	**09/08/04**	**09/08/04**	**09/08/04**
Location	**PRI-1b**	**PRI-2**	**PRI-4a**	**PRI-1b**	**PRI-2**	**PRI-4a**
Analysis						
Gross Alpha-Sol	< 1.2	< 1.6	< 1.6	< 1.8	< 2.3	< 2.0
Gross Beta-Sol	< 2.3	4.0 +- 2.0	3.2 +- 1.6	< 2.4	4.0 +- 2.0	3.0 +- 2.0
Gross Alpha-Insol	< 1.0	< 1.0	1.3 +- 1.0	< 1.3	< 1.4	< 1.4
Gross Beta-Insol	< 2.4	< 2.4	< 2.4	< 2.4	< 2.4	< 2.5
H-3	< 300	< 300	< 300	< 300	< 300	< 300
Sr-89	< 0.3	< 0.3	< 0.4	< 0.7	< 0.7	< 0.7
Sr-90	< 0.3	< 0.3	0.5 +- 0.2	< 0.3	< 0.3	< 0.3
gamma isotopic						
Mn-54	< 9	< 9	< 10	< 11	< 9	< 10
Co-58	< 8	< 10	< 10	< 10	< 9	< 9
Fe-59	< 17	< 19	< 19	< 22	< 17	< 18
Co-60	< 9	< 11	< 11	< 12	< 9	< 9
Zn-65	< 18	< 20	< 20	< 21	< 20	< 20
Nb-95	< 8	< 10	< 10	< 11	< 8	< 9
Zr-95	< 15	< 19	< 17	< 19	< 16	< 17
I-131	< 13	< 13	< 11	< 14	< 9	< 11
Cs-134	< 9	< 10	< 10	< 11	< 9	< 10
Cs-137	< 9	< 10	< 10	< 12	< 9	< 9
Ba-140	< 39	< 40	< 39	< 46	< 34	< 39
La-140	< 11	< 15	< 15	< 13	< 12	< 16

Radioisotopes other than those reported were not detected.

Table 10. WI DHFS analysis results of fish samples collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi / kg (wet)

Collection date	**05/17/04**	**05/19/04**	**09/13/04**	**09/15/04**
Location	**Downstream**	**Upstream**	**Downstream**	**Upstream**
Type	**White Bass**	**White Bass**	**White Bass**	**White Bass**
Radioisotopes				
K-40	3300 +- 200	3000 +- 200	3060 +- 150	2650 +- 150
Mn-54	< 29	< 30	< 24	< 21
Co-58	< 32	< 40	< 23	< 22
Fe-59	< 80	< 110	< 60	< 70
Co-60	< 30	< 37	< 22	< 21
Zn-65	< 80	< 80	< 51	< 60
Nb-95	< 41	< 42	< 25	< 26
Zr-95	< 60	< 70	< 44	< 41
Cs-134	< 30	< 26	< 19	< 19
Cs-137	< 31	< 32	< 22	< 23

Radioisotopes other than those reported were not detected.

Table 11. WI DHFS analysis results of well water samples collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Location	**PRI-4a**	**PRI-5**	**PRI-6b**	**PRI-4a**	**PRI-5**	**PRI-6b**
Collection date	**05/25/04**	**05/25/04**	**05/25/04**	**09/08/04**	**09/08/04**	**09/08/04**
gross alpha	< 3.0	< 2.2	< 2.4	< 1.3	< 1.8	< 1.6
gross beta	< 1.8	1.8 +- 1.2	< 1.8	< 1.3	1.8 +- 0.8	< 1.2
H-3	< 300	< 300	< 300	< 300	< 300	< 300

Table 12. WI DHFS analysis results of milk samples collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Location	PRI-13	PRI-10	PRI-13	PRI-10	PRI-13	PRI-10
Collection date	**01/14/04**	**02/10/04**	**03/09/04**	**04/14/04**	**05/04/04**	**06/15/04**
Analysis						
I-131	< 0.2	< 0.2	< 0.2	< 0.3	< 0.3	< 0.2
Sr-90	1.0 +- 0.2	< 0.3	1.0 +- 0.2	1.5 +- 0.2	1.0 +- 0.2	0.6 +- 0.2
gamma isotopic						
K-40	1400 +- 200	1600 +- 200	1600 +- 200	1590 +- 60	1420 +- 60	1630 +- 50
Mn-54	< 8	< 7	< 7	< 6	< 10	< 5
Co-58	< 8	< 7	< 6	< 7	< 9	< 6
Fe-59	< 22	< 26	< 22	< 14	< 21	< 12
Co-60	< 11	< 10	< 10	< 7	< 10	< 6
Zn-65	< 20	< 22	< 20	< 15	< 23	< 13
Nb-95	< 8	< 7	< 7	< 7	< 9	< 6
Zr-95	< 18	< 17	< 16	< 11	< 16	< 10
I-131	< 12	< 11	< 8	< 13	< 11	< 10
Cs-134	< 9	< 8	< 8	< 7	< 9	< 6
Cs-137	< 8	< 7	< 7	< 7	< 10	< 5
Ba-140	< 34	< 32	< 26	< 36	< 36	< 26
La-140	< 14	< 15	< 12	< 10	< 13	< 8

Location	PRI-13	PRI-10	PRI-13	PRI-10	PRI-13	PRI-10
Collection date	**07/13/04**	**08/11/04**	**09/14/04**	**10/13/04**	**11/16/04**	**12/14/04**
Analysis						
I-131	< 0.3			< 0.4		
Sr-90	1.0 +- 0.2	0.7 +- 0.2	0.9 +- 0.2	0.4 +- 0.2	1.3 +- 0.3	< 0.3
gamma isotopic						
K-40	1410 +- 60	1670 +- 60	1440 +- 60	1440 +- 60	1460 +- 60	1400 +- 80
Mn-54	< 8	< 9	< 10	< 8	< 9	< 9
Co-58	< 9	< 9	< 9	< 8	< 9	< 9
Fe-59	< 18	< 20	< 20	< 17	< 20	< 19
Co-60	< 10	< 9	< 10	< 9	< 11	< 11
Zn-65	< 22	< 21	< 21	< 17	< 21	< 23
Nb-95	< 7	< 9	< 9	< 8	< 9	< 9
Zr-95	< 14	< 15	< 17	< 14	< 15	< 17
I-131	< 10	< 12	< 13	< 11	< 11	< 11
Cs-134	< 8	< 9	< 9	< 8	< 9	< 9
Cs-137	< 9	< 9	< 10	< 8	< 9	< 10
Ba-140	< 34	< 36	< 39	< 35	< 40	< 37
La-140	< 13	< 12	< 12	< 12	< 13	< 11

Radioisotopes other than those reported were not detected.

Table 12. WI DHFS analysis results of milk samples collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi/liter

Location	**PRI-14**	**PRI-15**	**PRI-15**	**PRI-15**	**PRI-15**	**PRI-15**
Collection date	**01/14/04**	**02/10/04**	**03/09/04**	**04/14/04**	**05/04/04**	**06/15/04**
Analysis						
I-131	< 0.2	< 0.3	< 0.2	< 0.3	< 0.2	< 0.2
Sr-90	1.2 +- 0.2	0.6 +- 0.2	0.8 +- 0.2	1.2 +- 0.2	0.8 +- 0.2	0.8 +- 0.2
gamma isotopic						
K-40	1600 +- 200	1500 +- 200	1500 +- 200	1470 +- 70	1470 +- 50	1460 +- 50
Mn-54	< 5	< 5	< 5	< 9	< 5	< 5
Co-58	< 5	< 5	< 5	< 10	< 6	< 5
Fe-59	< 18	< 16	< 17	< 23	< 14	< 11
Co-60	< 7	< 7	< 7	< 11	< 6	< 5
Zn-65	< 14	< 14	< 13	< 21	< 13	< 11
Nb-95	< 5	< 5	< 5	< 10	< 6	< 5
Zr-95	< 11	< 12	< 10	< 17	< 11	< 8
I-131	< 8	< 8	< 5	< 19	< 14	< 9
Cs-134	< 6	< 6	< 6	< 9	< 5	< 5
Cs-137	< 5	< 5	< 5	< 9	< 6	< 5
Ba-140	< 21	< 21	< 16	< 52	< 36	< 25
La-140	< 9	< 9	< 6	< 15	< 12	< 7

Location	**PRI-15**	**PRI-15**	**PRI-15**	**PRI-15**	**PRI-15**	**PRI-15**
Collection date	**07/13/04**	**08/11/04**	**09/14/04**	**10/13/04**	**11/16/04**	**12/14/04**
Analysis						
I-131	< 0.2			< 0.5		< 0.3
Sr-90	0.9 +- 0.2	1.2 +- 0.2	1.1 +- 0.2	1.6 +- 0.3	1.3 +- 0.2	0.8 +- 0.2
gamma isotopic						
K-40	1490 +- 60	1640 +- 60	1370 +- 60	1510 +- 50	1380 +- 70	1350 +- 90
Mn-54	< 6	< 9	< 10	< 8	< 11	< 10
Co-58	< 6	< 8	< 10	< 8	< 11	< 9
Fe-59	< 13	< 19	< 20	< 18	< 23	< 22
Co-60	< 7	< 9	< 11	< 9	< 12	< 11
Zn-65	< 15	< 19	< 24	< 18	< 26	< 22
Nb-95	< 6	< 9	< 9	< 8	< 11	< 9
Zr-95	< 11	< 16	< 18	< 14	< 21	< 14
I-131	< 9	< 13	< 10	< 13	< 11	< 10
Cs-134	< 7	< 9	< 11	< 8	< 11	< 10
Cs-137	< 6	< 9	< 10	< 8	< 11	< 9
Ba-140	< 28	< 39	< 36	< 38	< 40	< 33
La-140	< 8	< 12	< 12	< 11	< 15	< 14

In February the Huppert farm (PRI-14) decided not to participate in the Prairie Island Environmental monitoring program. The replacement farm is the Roger Peterson farm (PRI-15).

Radioisotopes other than those reported were not detected.

Table 13. WI DHFS analysis results of vegetation samples collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi / kg (wet)

Collection date	**05/25/04**	**05/25/04**	**05/25/04**	**05/25/04**	**05/25/04**	**05/25/04**
Location	**PRI-1b**	**PRI-4b**	**PRI-5**	**PRI-6a**	**PRI-8**	**PRI-9**
Analysis						
Gross Alpha	< 1800	< 1200	< 1400	< 1600	< 1500	< 2000
Gross Beta	5400 +- 1300	7700 +- 1000	5600 +- 1000	5500 +- 1200	5600 +- 1100	7400 +- 1500
Gamma Isotopic						
Be-7	700 +- 200	670 +- 100	600 +- 200	450 +- 120	1100 +- 200	2300 +- 150
K-40	5800 +- 400	4100 +- 200	3700 +- 400	5800 +- 300	4600 +- 300	5900 +- 300
Mn-54	< 60	< 37	< 80	< 50	< 60	< 45
Co-58	< 60	< 38	< 60	< 49	< 60	< 41
Fe-59	< 120	< 80	< 170	< 120	< 140	< 100
Co-60	< 60	< 43	< 80	< 60	< 70	< 52
Zn-65	< 160	< 90	< 150	< 110	< 130	< 90
Nb-95	< 70	< 36	< 60	< 49	< 60	< 34
Zr-95	< 110	< 60	< 110	< 80	< 100	< 70
I-131	< 80	< 52	< 70	< 51	< 80	< 48
Cs-134	< 60	< 31	< 60	< 45	< 60	< 39
Cs-137	< 60	< 37	< 70	< 47	< 60	< 45
Ba-140	< 250	< 150	< 240	< 180	< 230	< 150
La-140	< 60	< 37	< 90	< 60	< 60	< 70

Collection date	**09/08/04**	**09/08/04**	**09/08/04**	**09/08/04**	**09/08/04**	**09/08/04**
Location	**PRI-1b**	**PRI-4b**	**PRI-5**	**PRI-6a**	**PRI-8**	**PRI-9**
Analysis						
Gross Alpha	< 1900	< 2400	< 2000	< 2500	< 1800	< 3000
Gross Beta	9700 +- 1500	9000 +- 2000	8300 +- 1500	8000 +- 2000	9500 +- 1400	8000 +- 2000
Gamma Isotopic						
Be-7	1600 +- 200	2100 +- 200	2100 +- 200	2600 +- 200	1400 +- 200	2300 +- 200
K-40	7900 +- 400	5700 +- 400	6800 +- 400	5500 +- 300	5400 +- 400	4500 +- 400
Mn-54	< 60	< 80	< 60	< 60	< 90	< 80
Co-58	< 60	< 70	< 60	< 53	< 70	< 70
Fe-59	< 120	< 150	< 140	< 130	< 150	< 190
Co-60	< 70	< 80	< 60	< 60	< 100	< 90
Zn-65	< 140	< 180	< 160	< 120	< 210	< 200
Nb-95	< 52	< 70	< 60	< 48	< 70	< 70
Zr-95	< 100	< 130	< 90	< 110	< 160	< 120
I-131	< 80	< 80	< 60	< 70	< 80	< 70
Cs-134	< 60	< 70	< 60	< 50	< 80	< 70
Cs-137	< 60	< 70	< 60	< 70	< 80	< 80
Ba-140	< 220	< 280	< 220	< 220	< 270	< 280
La-140	< 70	< 70	< 60	< 70	< 80	< 90

Radioisotopes other than those reported were not detected.

Table 14. WI DHFS analysis results of soil samples collected for the WI DHFS Prairie Island environmental monitoring program.

Measurements in units of pCi / kg (dry)

Collection date	**05/25/04**	**05/25/04**	**05/25/04**	**05/25/04**	**05/25/04**	**05/25/04**
Location	**PRI-1b**	**PRI-4b**	**PRI-5**	**PRI-6a**	**PRI-8**	**PRI-9**
Analysis						
Gross Alpha	< 6000	< 6000	< 6000	< 6000	< 6000	< 6000
Gross Beta	14000 +- 4000	13000 +- 4000	14000 +- 4000	18000 +- 4000	21000 +- 4000	11000 +- 4000
Gamma Isotopic						
K-40	9400 +- 300	12100 +- 400	10300 +- 300	13600 +- 400	13100 +- 400	12400 +- 400
Mn-54	< 29	< 24	< 12	< 30	< 11	< 23
Co-58	< 41	< 29	< 15	< 34	< 13	< 30
Fe-59	< 110	< 90	< 41	< 100	< 33	< 90
Co-60	< 31	< 28	< 13	< 33	< 11	< 26
Zn-65	< 100	< 70	< 37	< 90	< 35	< 80
Nb-95	< 50	< 44	< 21	< 50	< 19	< 42
Zr-95	< 70	< 60	< 26	< 60	< 24	< 53
Cs-134	< 43	< 32	< 14	< 46	< 15	< 34
Cs-137	120 +- 10	133 +- 9	131 +- 7	233 +- 13	103 +- 6	193 +- 11

Collection date	**09/08/04**	**09/08/04**	**09/08/04**	**09/08/04**	**09/08/04**	**09/08/04**
Location	**PRI-1b**	**PRI-4b**	**PRI-5**	**PRI-6a**	**PRI-8**	**PRI-9**
Analysis						
Gross Alpha	< 6000	< 6000	< 6000	8000 +- 5000	< 6000	< 6000
Gross Beta	18000 +- 4000	18000 +- 4000	19000 +- 4000	22000 +- 4000	26000 +- 5000	15000 +- 4000
Gamma Isotopic						
K-40	10600 +- 300	11800 +- 400	11700 +- 400	13700 +- 400	14100 +- 400	11200 +- 300
Mn-54	< 7	< 16	< 19	< 25	< 15	< 5
Co-58	< 7	< 18	< 17	< 24	< 13	< 5
Fe-59	< 18	< 45	< 43	< 54	< 33	< 13
Co-60	< 8	< 19	< 18	< 26	< 15	< 5
Zn-65	< 25	< 56	< 60	< 80	< 45	< 17
Nb-95	< 10	< 20	< 19	< 26	< 17	< 6
Zr-95	< 12	< 30	< 34	< 41	< 24	< 9
Cs-134	< 11	< 26	< 30	< 40	< 22	< 7
Cs-137	72 +- 4	88 +- 7	203 +- 10	286 +- 14	136 +- 8	193 +- 5

Naturally occurring radioisotopes such as radium-226 (^{226}Ra), bismuth-214 (^{214}Bi), lead-214 (^{214}Pb), actinium-228 (^{228}Ac), bismuth-212 (^{212}Bi) and lead-212 (^{212}Pb) from the naturally occurring uranium-238 (^{238}U) and thorium-232 (^{232}Th) decay series are commonly detected but have not been quantified or reported.

Radioisotopes other than those reported were not detected.